

Bacteria Total Maximum Daily Load Studies for Hunting Creek, Cameron Run, and Holmes Run



Technical Advisory Committee Meeting
March 10, 2009



Meeting Agenda

- **TMDL Overview**

Katie Conaway, VA Department of Environmental Quality

- **Technical Approach for TMDL Development**

Ross Mandel, Interstate Commission on the Potomac River Basin

- **Next Steps**

- **Questions**

TMDL Background Information

Why are we here?

- Hunting Creek, Cameron Run, and portions of Holmes Run do not meet the water quality standards recreational use.

Stream Name	Area	Upstream Limit	Downstream Limit	DEQ Monitoring Stations	Exceedance Rate*
Hunting Creek (Tidal)	0.53 square miles	Route 241 (Telegraph Road) Bridge Crossing	Confluence with the Potomac River	Station 1aHUT000.01 (Located at the George Washington Memorial Parkway)	11 of 17 samples (40.7% exceedance)
				Station 1aHUT001.72 (Located at Telegraph Road)	3 of 11 samples (27.3% exceedance)
Cameron Run (Non-Tidal)	2.08 miles	Confluence with Backlick Run	Route 241 (Telegraph Road) Bridge Crossing	Station 1aCAM002.92 (Located at Eisenhower Avenue)	5 of 18 samples (27.8% exceedance)
Holmes Run (Non-Tidal)	3.58 miles	Mouth of Lake Barcroft	Confluence with Backlick Run	Station 1aHOR001.04 (Located at Pickett Street)	3 of 12 samples (25% exceedance)

- The attainment of the recreational water quality standard use is assessed using E. coli bacteria criteria:

Indicator	Single Sample Maximum (cfu/100mL)	Geometric Mean (cfu/100mL)
E. coli	235	126

* Exceedance rates taken from the 2008 Integrated Assessment, which looked at data from 01/01/2001 to 12/31/2006.

What happens when a water body doesn't meet water quality standards?

- Waterbody is listed as “impaired” and placed on the 303(d) list.
- Once a water body is listed as impaired, a Total Maximum Daily Load value must be developed for that impaired stream segment to address the designated use impairment.
- TMDL Studies are required by law:
 - 1972 Clean Water Act (CWA)
 - 1997 Water Quality Monitoring Information and Restoration Act (WQMIRA)

What is a TMDL ?

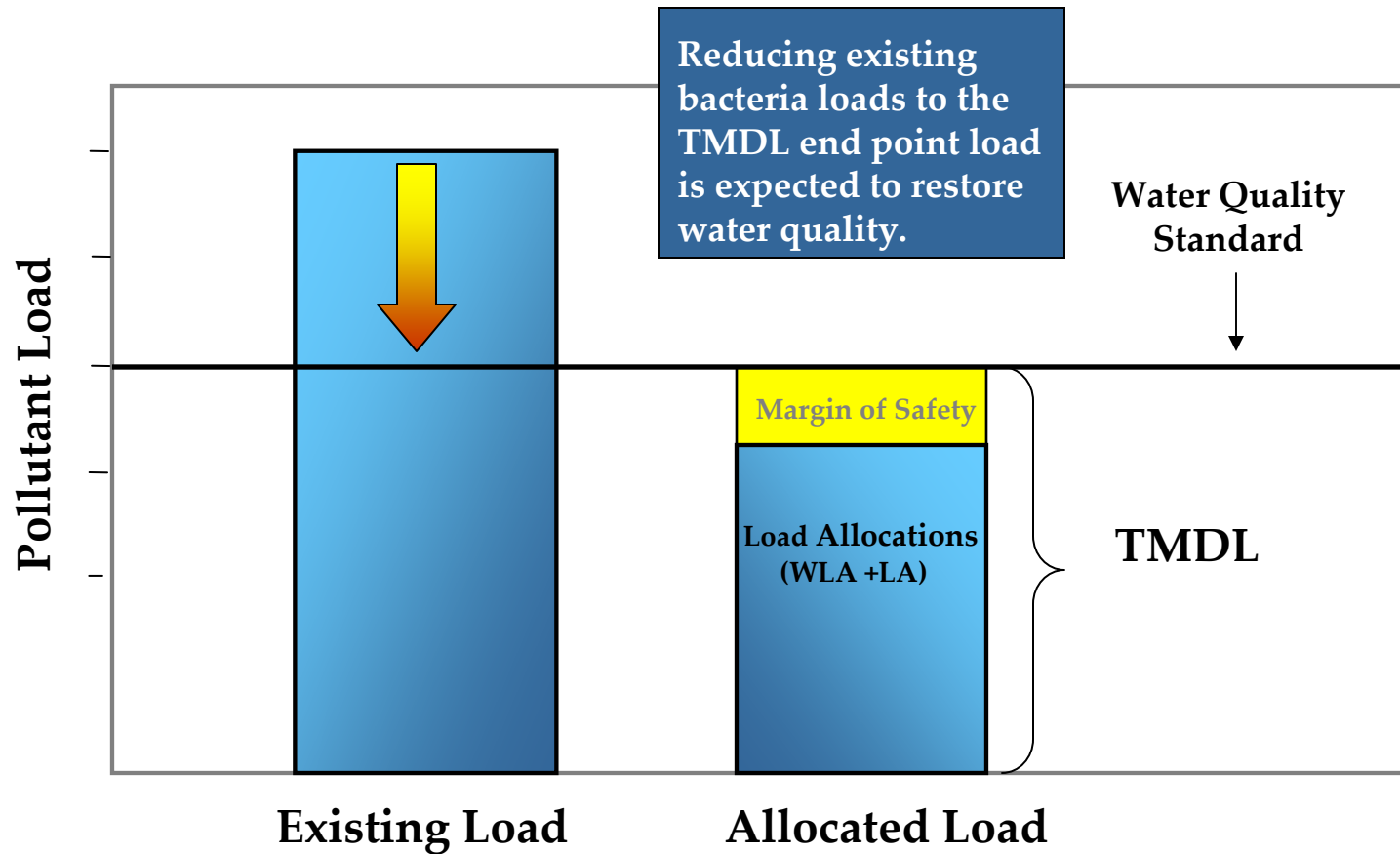
Total Maximum Daily Load

$$\text{TMDL} = \text{Sum of WLA} + \text{Sum of LA} + \text{MOS}$$

Where:

TMDL	=	Total Maximum Daily Load
WLA	=	Waste Load Allocation (point sources)
LA	=	Load Allocation (nonpoint sources)
MOS	=	Margin of Safety

An Example TMDL



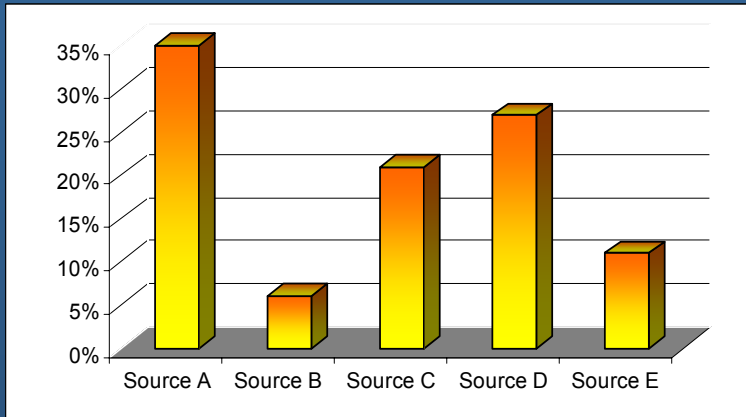
Required Elements of a TMDL

A TMDL must:

- Be developed to meet Water Quality Standards
- Be developed for critical stream conditions
- Consider seasonal variations
- Consider impacts of background contributions
- Include wasteload and load allocations (WLA, LA)
- Include a margin of safety (MOS)
- Be subject to public participation
- Provide reasonable assurance of implementation

TMDL Development Methodology

1. Identify all sources of a given pollutant within the watershed.



2. Calculate the amount of pollutant entering the stream from each source type.

3. Enter available data into a computer model. Model simulates pollutant loadings into the watershed.

4. Use the model to calculate the pollutant reductions needed, by source, to attain Water Quality Standards.

5. Allocate the allowable loading to each source and include a margin of safety.



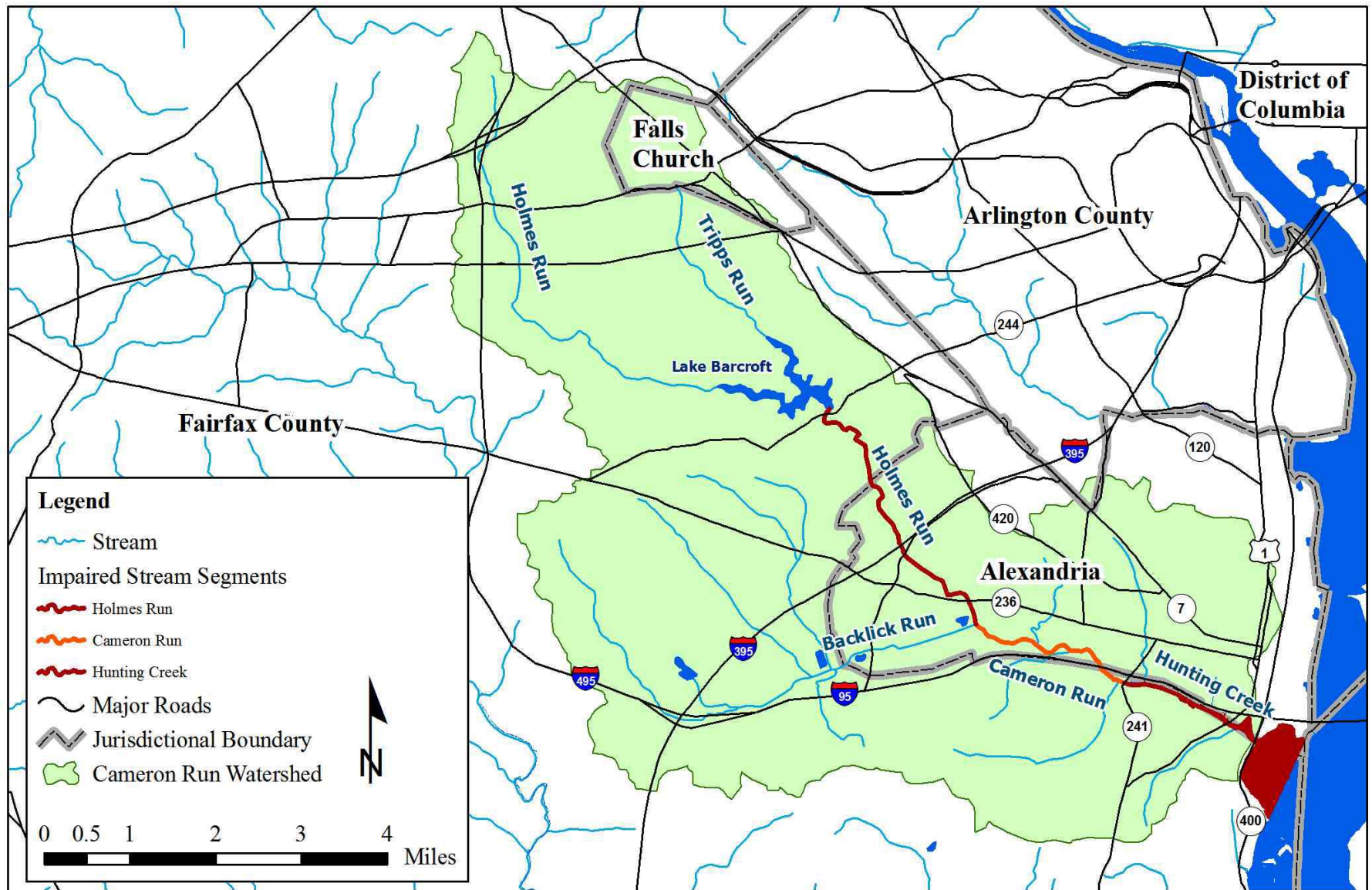
Questions?

Technical Approach for TMDL Development

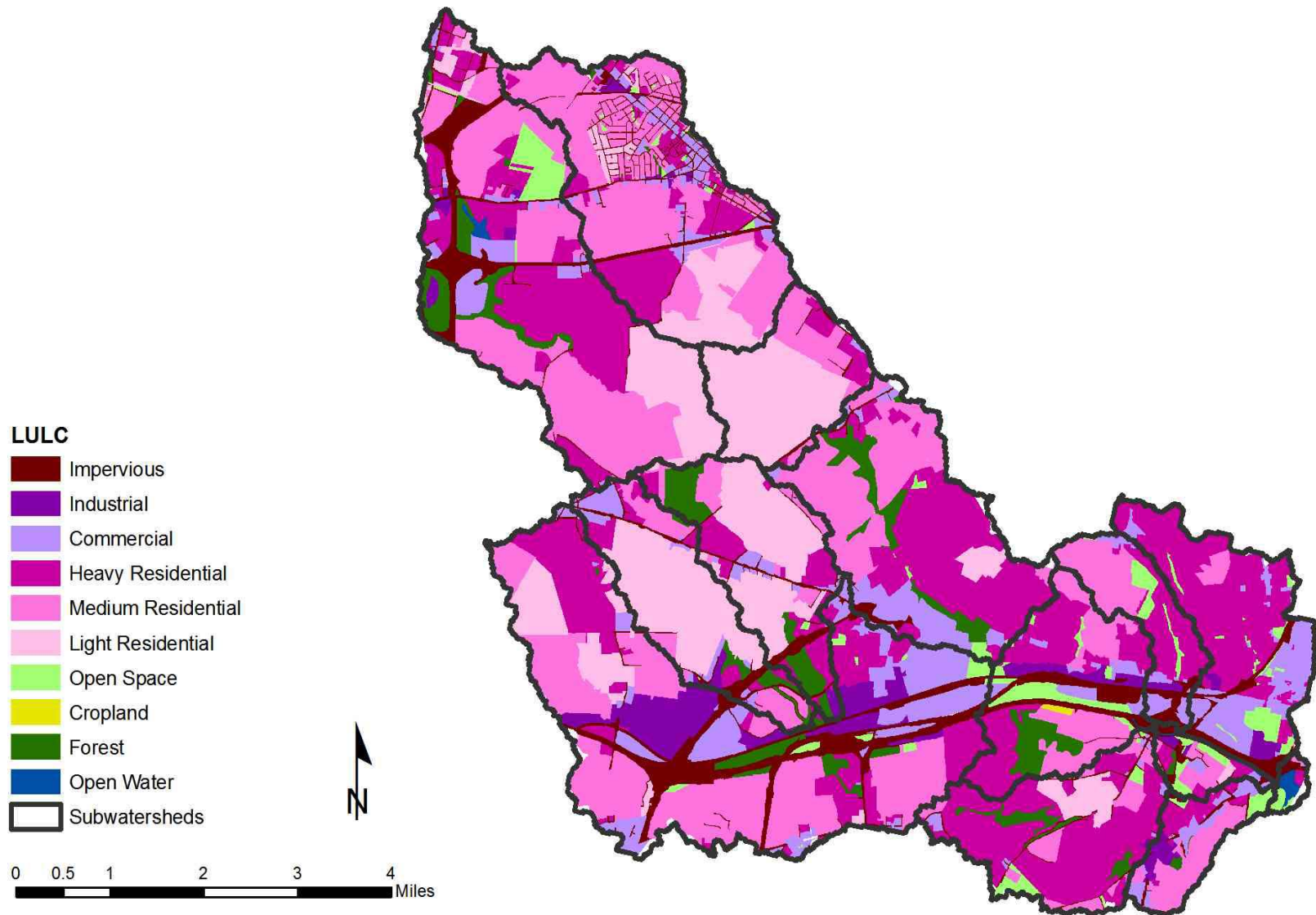
Topics

- Watershed Description
- Review of Existing Monitoring Data
- Source Assessment
- Technical Approach and Computer Models
- Tasks and Schedule

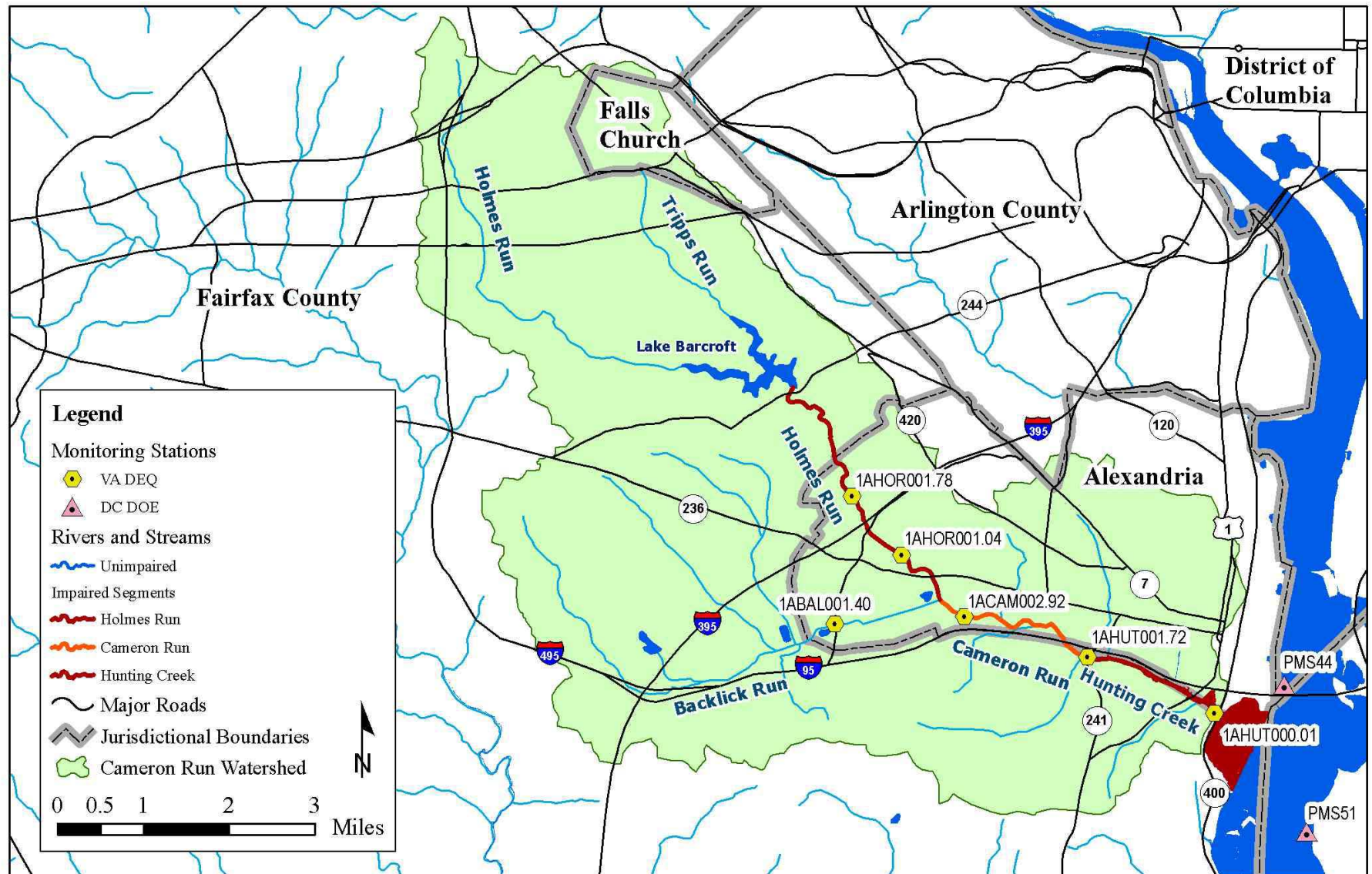
Location of Impaired Segments



Land Use

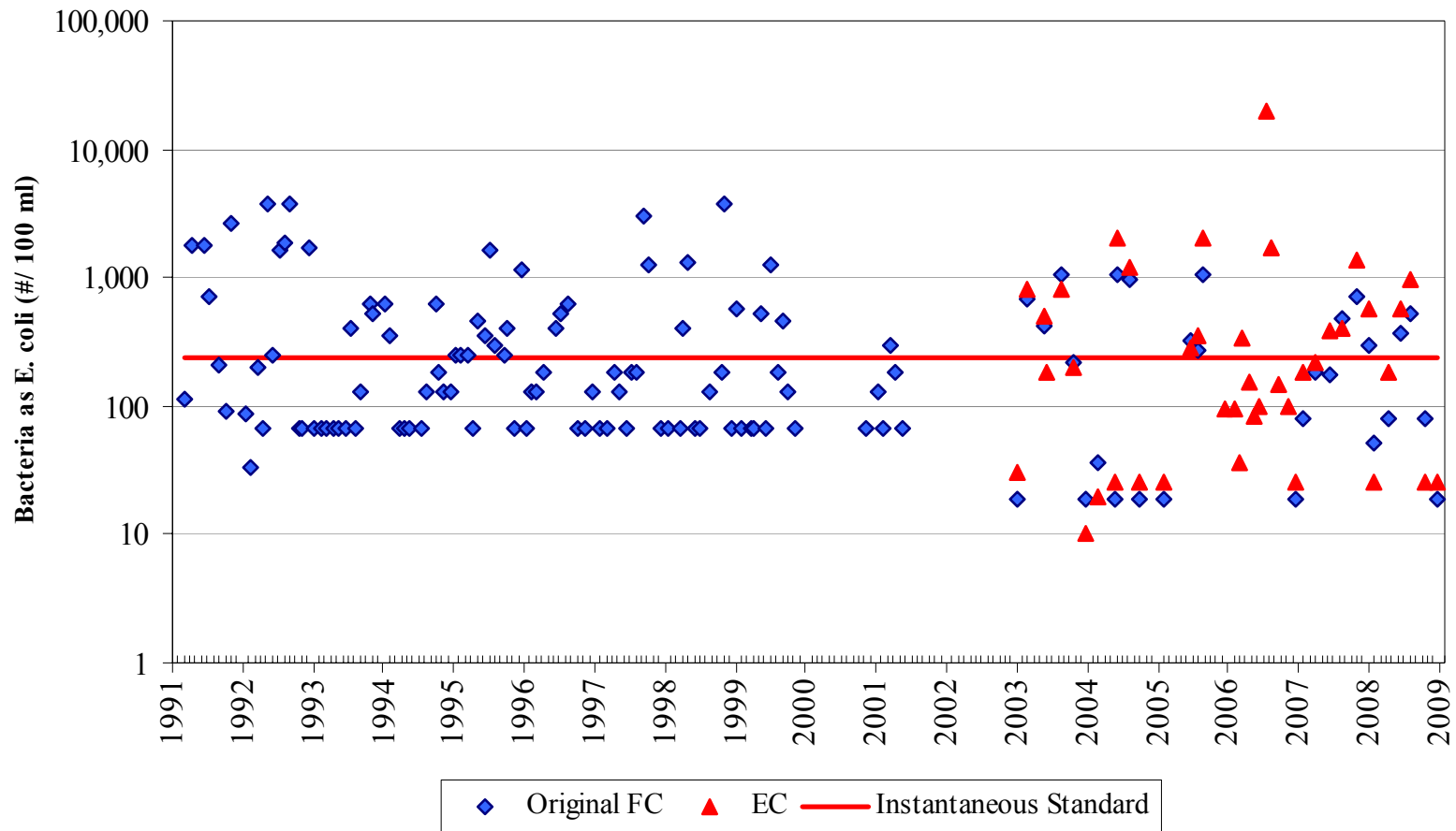


Monitoring Station Locations



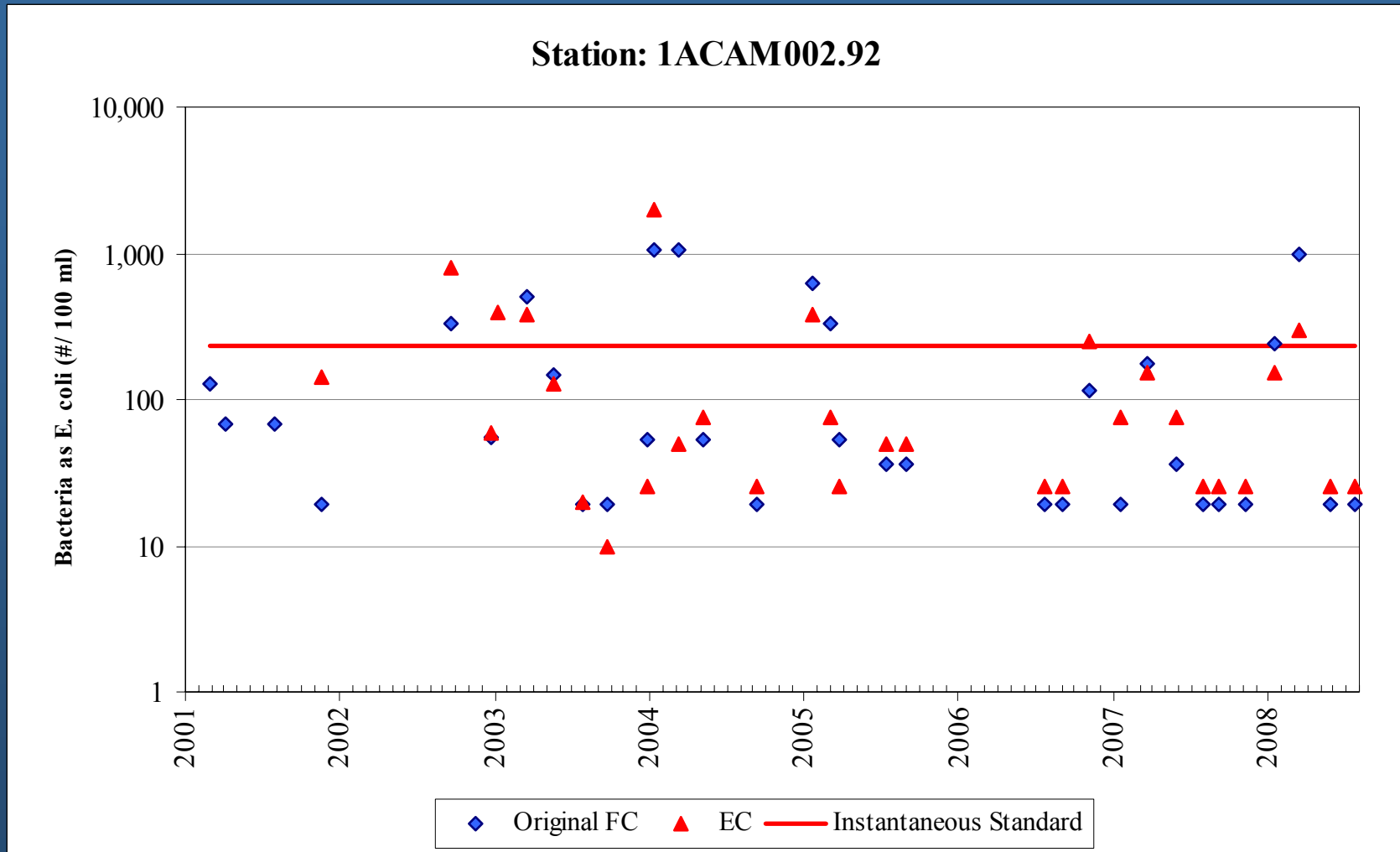
Bacteria Monitoring Data Equivalent *E. Coli* Concentration for Hunting Creek

Station: 1AHUT000.01



$$\log_2 EC = -0.0172 + 0.91905 * \log_2 FC$$

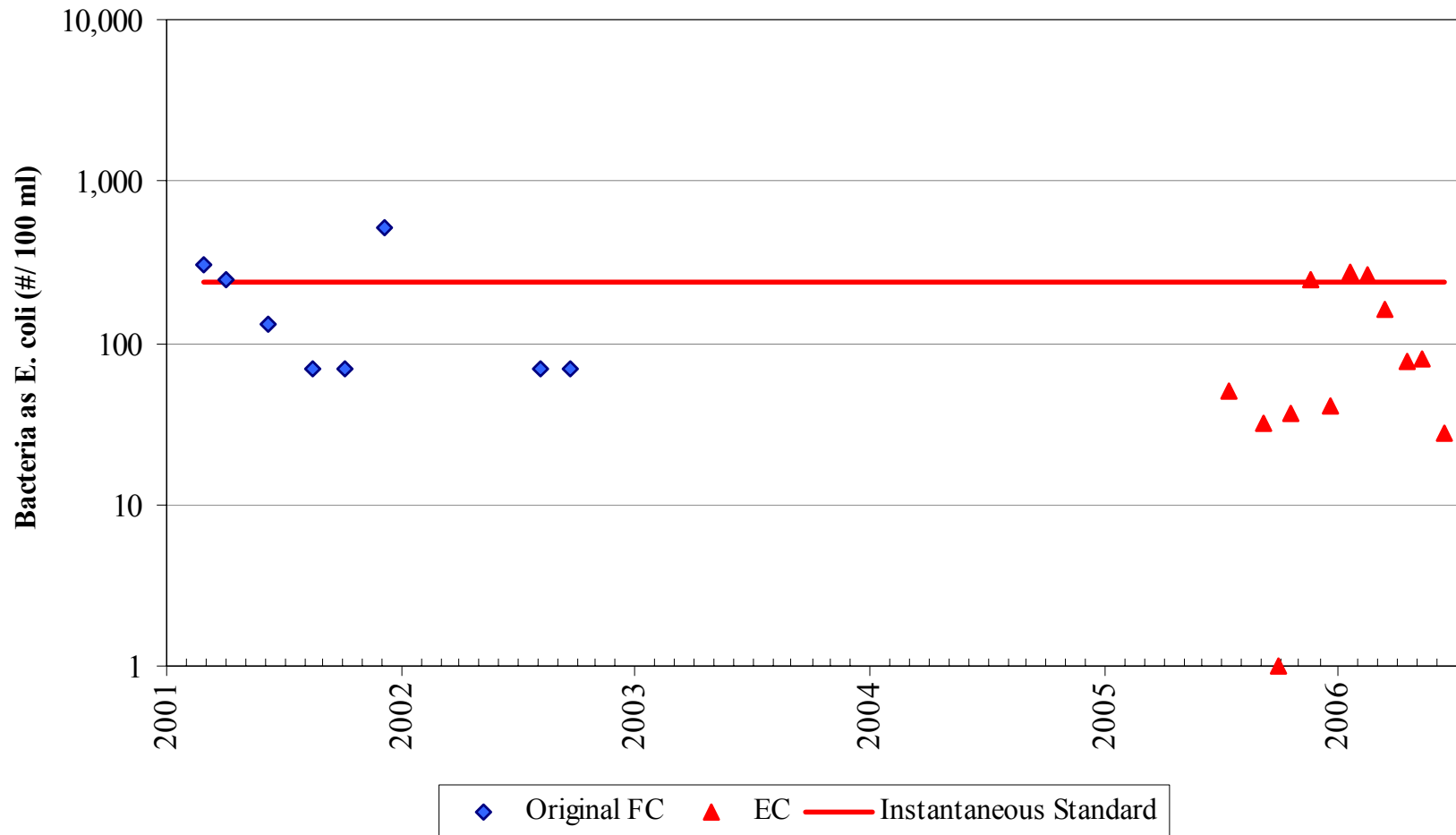
Bacteria Monitoring Data Equivalent *E. Coli* Concentration for Cameron Run



$$\log_2 EC = -0.0172 + 0.91905 * \log_2 FC$$

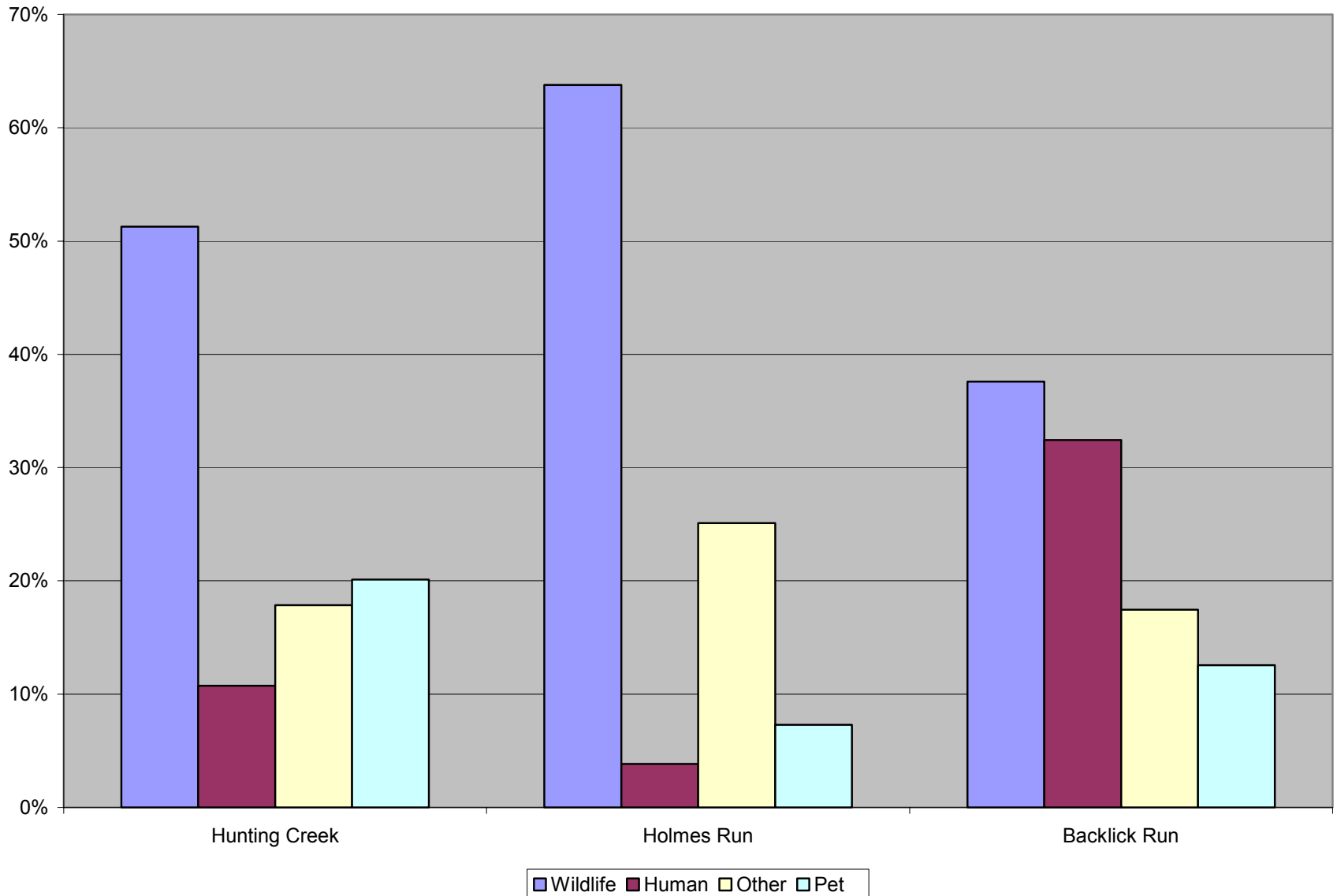
Bacteria Monitoring Data Equivalent *E. Coli* Concentration for Holmes Run

Station: 1AHOR001.04

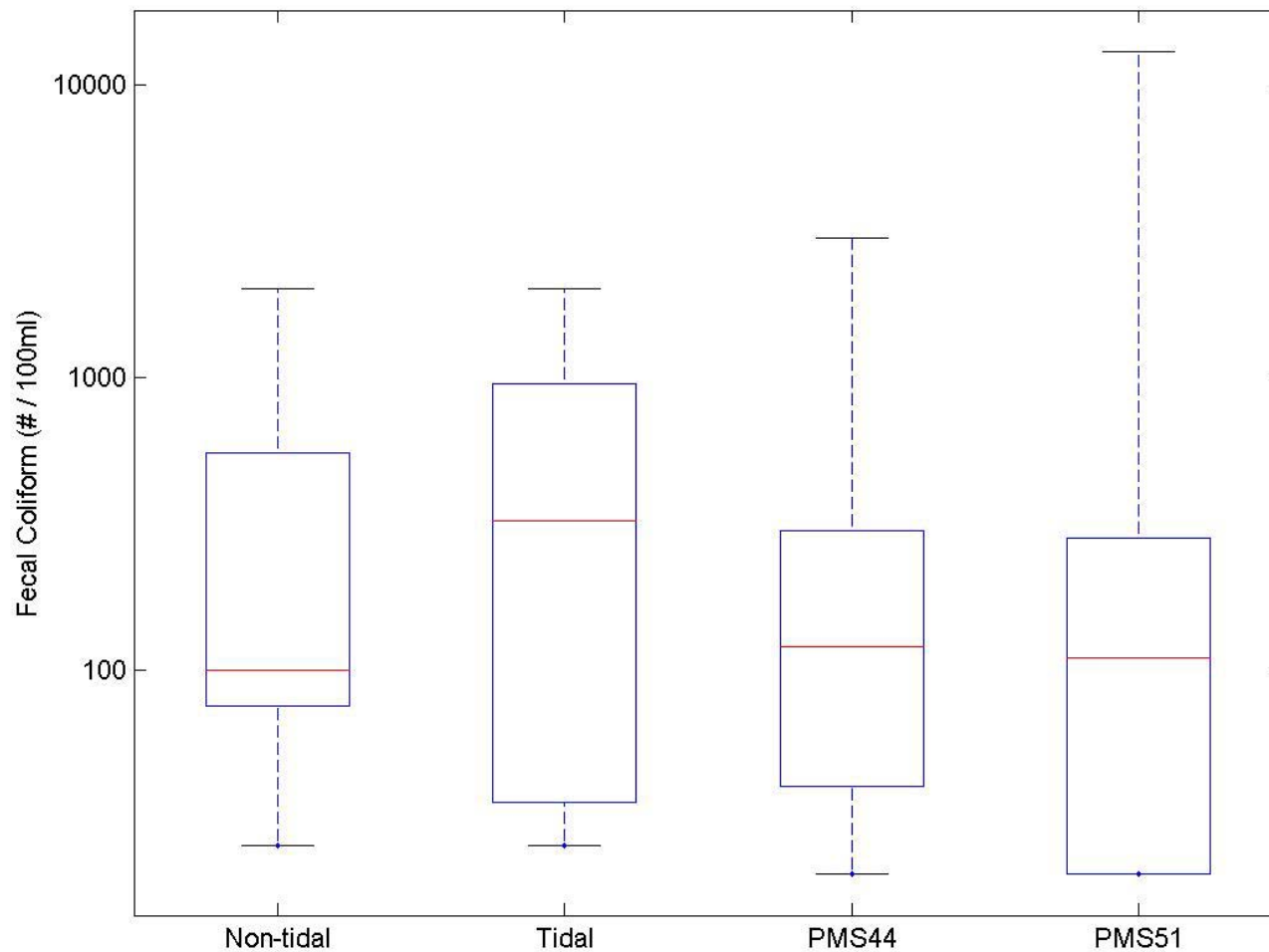


$$\log_2 EC = -0.0172 + 0.91905 * \log_2 FC$$

Bacteria Source Tracking (BST) Results



Comparison of Bacteria Concentrations at Monitoring Stations



Sources of Bacteria in Impaired Watersheds

- Alexandria Combined Sewer System (CSS)
- Alexandria Waste Water Treatment Plant
- Maryland Boundary
- Cameron Run Drainage
 - Wildlife
 - Human
 - Pets
 - Other



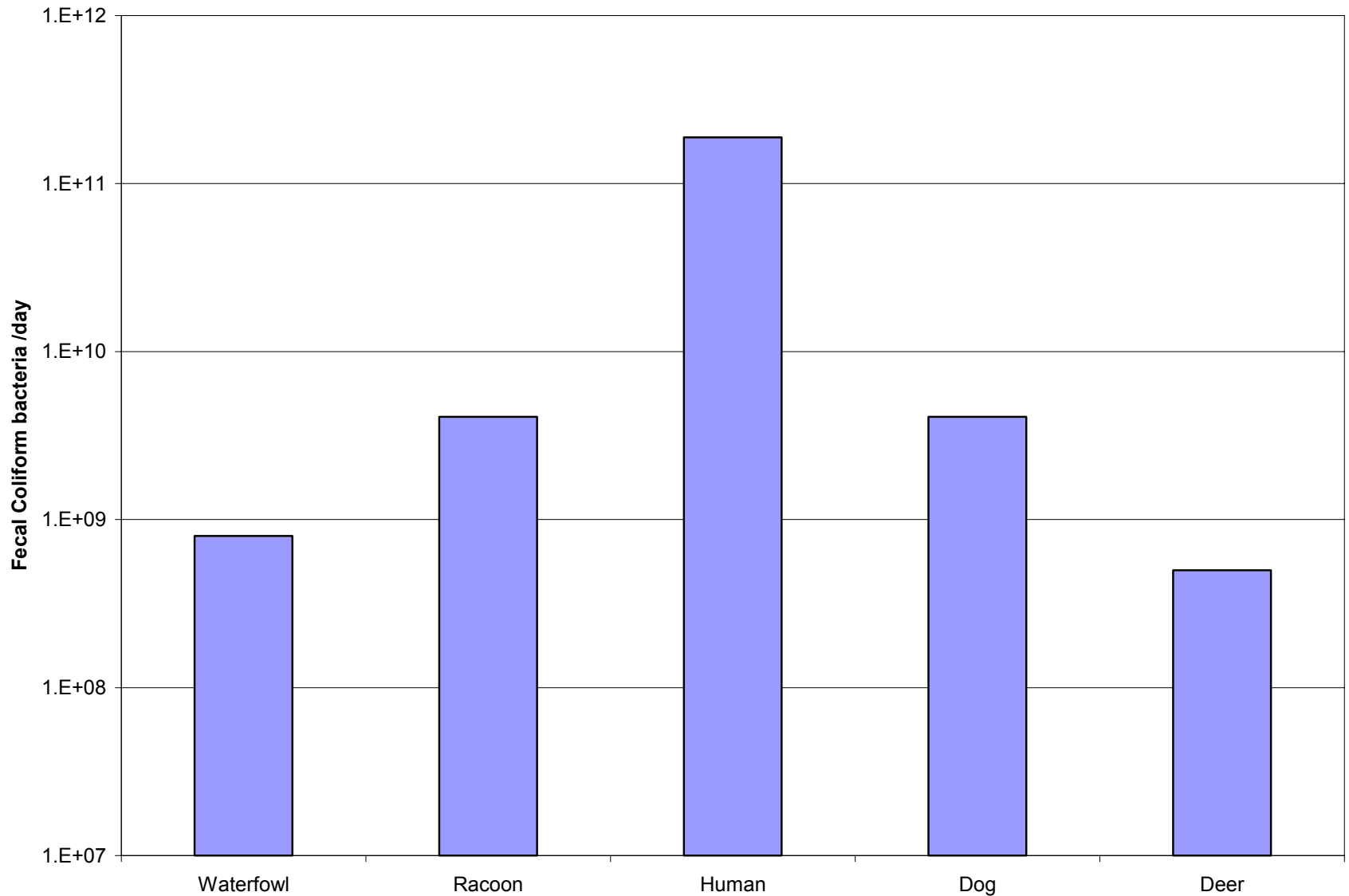
Other Permitted Sources

- Fairfax, Alexandria, Falls Church, and Arlington Municipal Separate Storm Sewer Systems (MS4)
- VDOT
- George Washington Memorial Parkway
- Fairfax County Public Schools

Basis of Source Assessment

- Species Bacteria Production
 - Studies in Scientific Literature
- Habitat
 - Naturalists Opinion; GIS Studies
- Bacteria Source Tracking (BST)
 - Genetic “Fingerprinting” or Antibiotic Resistance

Fecal Bacteria Production Rates



Technical Approach to TMDL Development

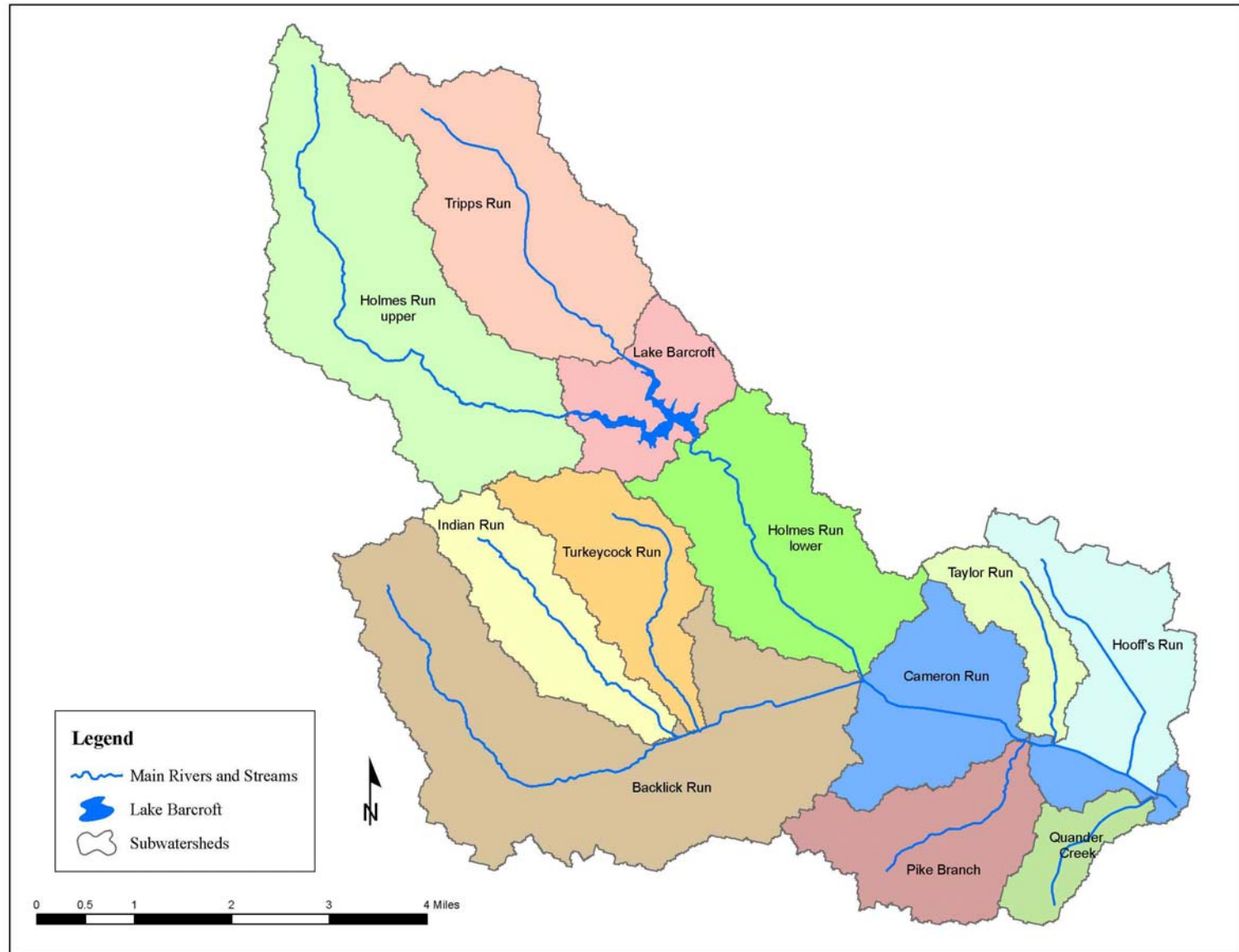
Computer Models

- Hydrological Simulation Program Fortran
(HSPF) Model of Cameron Run Watershed
(ICPRB)
- Euler Langrangian Circulation (ELCIRC)
Model of Hunting Creek/tidal Cameron Run
(VIMS)

HSPF Model

- Continuous simulation model of hydrology, river routing, and fate and transport of FC bacteria
- Established methodology used in many VA bacteria TMDLS (Four Mile Run, Upper and Lower Accotink Creeks)

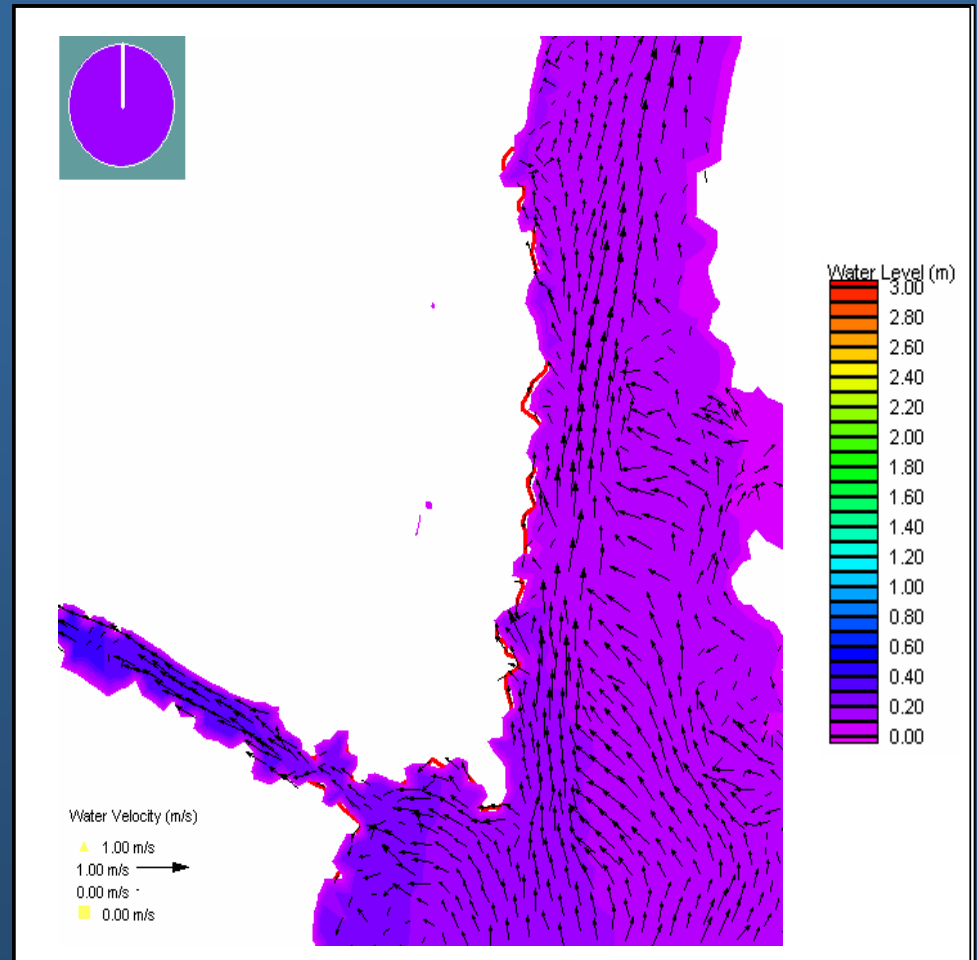
Preliminary HSPF Segmentation



ELCIRC Model

- Continuous 3-D simulation model of tidal hydrodynamics and water quality of Potomac River and its embayments
- Unstructured grid with variable resolution
- Incorporates wetting and drying in tidal flats

Preliminary ELCIRC Grid



What happens next?

1. Comment Period for Materials Presented at the TAC Meeting:

- March 10, 2009 to April 9, 2009
- Comments should be submitted in writing to:
Katie Conaway
mkconaway@deq.virginia.gov
13901 Crown Court, Woodbridge, VA 22193

2. Public Meeting:

- Wednesday, March 25, 2009 at 7:00 p.m.
Dr. Oswald Durant Memorial Center
Meeting Rooms 3 and 4
1605 Cameron Street, Alexandria, Virginia 22314
- Help to advertise the public meeting by distributing fact sheets and fliers to interested parties.

Project Tasks and Milestones

Hunting Creek/Cameron Run/Holmes Run Bacteria TMDL Studies	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10
Data Gathering																
TAC Meeting #1																
Public Meeting #1																
ELCIRC Model Setup																
HSPF Setup/Calibration																
TAC Meeting #2																
ELCIRC Model Calibration																
TAC Meeting #3																
Develop TMDL Scenarios																
TAC Meeting #4																
Prepare TMDL Reports																
Public Meeting #2																
Draft TMDL for Review																
Submit Draft Report to EPA																

**Dates are subject to change. TAC Meetings can be added or removed, depending on project needs.*

CONTACTS



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